



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| | | | | |
|--|-------------|----------------------|---------------------|------------------|
| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 09/865,601 | 05/29/2001 | Yunzhi Gao | GAO 1 | 4139 |
| 1444 | 7590 | 11/25/2003 | EXAMINER | |
| BROWDY AND NEIMARK, P.L.L.C. 624 NINTH STREET, NW SUITE 300 WASHINGTON, DC 20001-5303 | | | ALEJANDRO, RAYMOND | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1745 | |

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/865,601

Applicant(s)

GAO ET AL.

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,9-13 and 17 is/are rejected.
- 7) ☒ Claim(s) 2-8 and 14-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 6.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This communication is responsive to the amendment filed on 11/06/03. The applicants have overcome the objection, the 35 USC 112 rejection and the 35 USC 102 rejections.

However, the claims are newly rejected over art as seen below.

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention, the following species have been identified:

Species 1: claims 2-8, directed to the bipolar separator comprising an aluminum layer;

Species 2: claims 11-17, directed to the bipolar separator comprising a heat-resistant polymer layer;

Species 3: claims 18-19, directed to the bipolar separator comprising a conductive film.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after

Art Unit: 1745

the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. During a telephone conversation with applicant's representative on 07/14/03 (see also amendment paper # 5, page 15) it was indicated that the provisional election of Species 3 was incorrect as applicant originally intended to elect Species 1. Accordingly, a provisional election was made with traverse to prosecute the invention of Species 1, claims 2-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-19 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Nevertheless, since the invention of Species 1, claims 2-8 have been found to be allowable, for purpose of prosecution, Species 2 including claims 9-17 has been also considered and treated on the merits. Thus, the invention of Species 2 has been examined as well.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
2. Clarifying note: Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon the application 2000-157189 filed in Japan on 05/26/00. A claim for priority under 35 U.S.C. 119(a)-(d) can be based on said application because even though the United States application was filed more than twelve months thereafter (Tuesday, May 29, 2001), Monday, May 28, 2001, was an official federal holiday (Memorial Day). Accordingly, May 29, 2001 was the next official government business day, and thus, the instant application was filed in a timely manner.

Drawings

4. The drawings filed on 05/29/01 has been accepted.

Specification

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1745

7. Claim 14-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 14 recites the limitation "an anodized aluminum layer" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 1 contains an earlier recitation of this limitation.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 9-13 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Saito et al 2002/0034672.

The instant application is directed to a bipolar separator wherein the disclosed inventive concept comprises the specific corrosion resistant layer disposed thereon. Other limitations include the specific the conductive film.

With reference to claim 1:

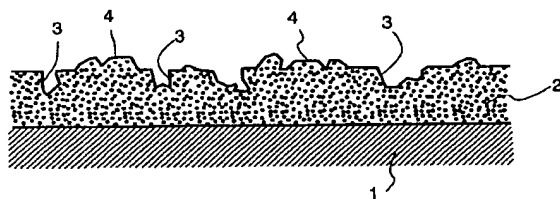
Saito et al disclose a separator for a fuel cell having a film on the surface (ABSTRACT/SECTION 0015). It is disclosed that the separator is generally a flat plate having a plurality of parallel grooves formed at one or both sides and has a role of transferring the

Art Unit: 1745

electricity generated at the gas diffusion electrode of the fuel cell to the exterior (*thus, it is a current collector*); the grooves are used as a path for the reactant gas (SECTION 0007/0036). It is disclosed that the separator base material is made of aluminum per se (SECTION 0035). It is disclosed that the conductive coating onto the base material formed a film thereon (SECTION 0020) and the binder use in the conductive coating may be any binder including, for example, thermosetting or thermoplastic resin rubber or the like (SECTION 0023-0026). *Thus, at least the thermosetting resin is a heat resistant polymer.*

Figure 1 illustrates the surface of the fuel cell separator having a film thereon:

Fig.1



With reference to claim 9-11:

Saito et al disclose the conductive coating comprises a binder including, for example, thermosetting or thermoplastic resin rubber or the like (SECTION 0023-0026), for instance, polyester resin, silicon resin, aromatic polyimide resin, polyethylene, polystyrene, polyethylene terephthalate, polyethersulfone, acrylic rubber (SECTIONS 0023-0026):

Art Unit: 1745

[0023] The binder used in the conductive coating may be any binder which can withstand the temperature range in which a fuel cell is operated. The binder includes, for example, a liquid or emulsion of thermosetting resin, thermoplastic resin, rubber or the like.

[0024] The thermosetting resin includes, for example, polycarbodiimide resin, phenolic resin, furfuryl alcohol resin, epoxy resin, cellulose, urea resin, melamine resin, unsaturated polyester resin, silicone resin, diallyl phthalate resin, resin obtained by using bismaleimide and triazine, polyaminobis-maleimide resin and aromatic polyimide resin. These resins can be used singly or in admixture of two or more kinds.

[0025] The thermoplastic resin includes, for example, polyethylene, polystyrene, polypropylene, polymethyl methacrylate, polyethylene terephthalate, polybutylene terephthalate, polyethersulfone, polycarbonate, polyoxamethylene, polyamide, polyimide, polyamideimide, polyvinyl alcohol, polyvinyl chloride, polyphenylsulfone, polyetheretherketone, polysulfone, polyetherketone, polyarylate, polyetherimide, polymethylpentene, fluororesin, polyoxybenzoyl ester resin, liquid crystal polyester resin, aromatic polyester, polyacetal, polyallylsulfone, polybenzimidazole, polyethernitrile, polythioethersulfone and polyphenylene ether. These resins can be used singly or in admixture of two or more kinds.

[0026] The rubber includes, for example, fluororubber, silicone rubber, butyl rubber, chloroprene rubber, nitrile rubber, nitrile-chloroprene rubber, chlorinated butyl rubber, epichlorohydrin rubber, epichlorohydrin-ethylene oxide rubber, epichlorohydrin-ethylene oxide-acryl glycidyl ether terpolymer, urethane rubber, acrylic rubber, ethylene-propylene rubber, styrene rubber, butadiene rubber and natural rubber. These rubbers can be used singly or in admixture of two or more kinds.

The specific corrosion resistant and heat resistant properties are inherent as products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed properties, are necessarily present in the prior art material.

With reference to claim 12:

It is disclosed that the separator base plate can be coated by coating the above-obtained separator material with the above materials (SECTION 0035). It is further disclosed that the base material for the fuel cell separator may be subjected to a surface-roughening treatment by coating with an adhesive such as a primer or the like (SECTION 0037). *Thus, a multi-layered structure is disclosed.*

With reference to claim 13 and 17:

Saito et al disclose the metal separator base material may be made of aluminum per se (SECTION 0035).

Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

Art Unit: 1745

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 9-10, 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quadakkers et al 5733682 and further in view of Faita et al 5482792.

With respect to claim 1, 13 and 17:

Quadakkers et al disclose a metallic bipolar plate for a fuel cell, the plate being a metal body (metal plate) having surfaces adapted to contact electrodes of the fuel cell and passages (flow channels) having walls confining gases; the body being composed of a metallic alloy wherein the alloy is being enriched with aluminum at least in regions of the walls in direct contact with the gases (ABSTRACT/claim 1). The bipolar plate consists of a metallic alloy with an aluminum enriched surface layer in the regions of the interconnector which are in contact with the gas (col 2, lines 35-38). *The regions which are in contact with the gas are the gas channels.*

It is disclosed that the aluminum enrichment which is applied at the surfaces of the gas-containing regions, especially internal surfaces of the gas passages, assures that in these places a protective coating is formed (col 2, line 67 to col 3, line 5) wherein the aluminum-enriched surface layer provides a bipolar plate with a significant corrosion resistance (col 2, lines 27-30). Quadakkers et al further disclose that aluminum-based compositions provide the required corrosion resistance (col 1, lines 58-61). It is also disclosed that the bipolar plates serve as load

Art Unit: 1745

carrying component (that is, as a current collector) (col 1, lines 37-41). Furthermore, the bipolar plate must have one of the following properties: good electrical conductivity (col 1, line 50).

Figure 1 illustrates the bipolar plate (1) arranged between an anode and a cathode wherein the bipolar plate has channels (4).

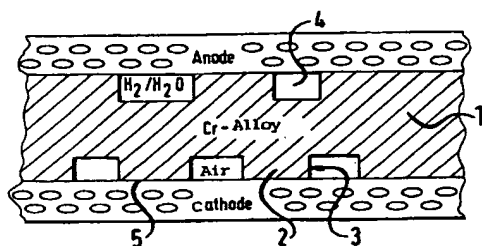


FIG. 1

Figure 2 shows the ribs (2) and the side walls (3) of the gas channel (4); wherein A and B represent the Al-enriched layers.

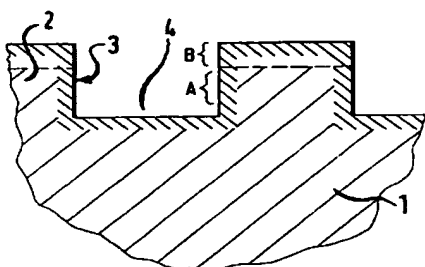


FIG. 2

Quadakkers et al disclose a fuel cell separator according to the foregoing. However, Quadakkers et al do not expressly disclose the specific corrosion resistant layer.

As to claims 1, 9-10:

It is also disclosed that the bipolar plates may be optionally coated with an electroconductive protective film, for example made of platinum group metals or oxide thereof; alternatively the protective film may be made of conductive polymers of the type comprising

Art Unit: 1745

intrinsically conductive materials or plastic materials containing conductive powders, for example graphite powder (col 10, lines 20-29).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the specific conductive film of Faita et al on contact faces of the bipolar plates of Quadakkers et al as Faita et al teach the bipolar plates may be optionally coated with an electroconductive protective film made of platinum group metals or plastic materials containing conductive powders such as graphite powder. It is desirable to dispose this specific conductive film on the bipolar plate surfaces because this conductive film on the bipolar plate contact face would enhance the ability of bipolar plates to resist possible aggressive conditions which may be particularly severe when the cell is fed with reactants on both electrode compartments.

Allowable Subject Matter

8. The following is a statement of reasons for the indication of allowable subject matter: a reasonable search for the prior art failed to reveal or fairly suggest what is instantly claimed, particularly: the separator metal plate comprising the specific anodized aluminum layer as recited in claims 2-8 and 14-16.

9. Claims 2-8 and 14-16 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. With respect to the election of species, please note the following: since the invention of Species 1, claims 2-8 have been found to be allowable, for purpose of prosecution, Species 2

Art Unit: 1745

including claims 9-17 has been also considered and treated on the merits. Thus, the invention of Species 2 has been examined as well.

Response to Arguments

10. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

